



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,134	12/17/2001	Marc Schrader	10191/1986	1915
26646	7590	12/08/2004	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			GOSHTASBI, JAMSHID	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/914,134

Applicant(s)

SCHRADER ET AL.

Examiner

Jamshid Goshtasbi-G.

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-17 and 19-21 is/are rejected.
- 7) ☒ Claim(s) 18 and 22-26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 08/23/01.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. Claims 13-26 are pending in the application.

#### ***Drawings***

2. The drawings are objected to because the rectangular boxes in figures 1-3 should be provided descriptive text labels. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Marked-up Drawings" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

***Claim Rejections – 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13-15, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cox et al. (US 5732333) in view of Salinger (US 6252912 B1), and further in view of Dent et al. (US 5262734).

As to **Claim 13**, Cox et al. discloses a transmitter for sending a signal over a wireless channel (figs. 1 and 2), comprising (col. 3, line 66 – col. 4, line 15; col. 6, lines 2948) a modulator (digital modulator 103) for modulating the signal to produce a modulated signal; a predistorter (predistorter 107) for predistorting the modulated signal according to an amplifier transfer property (col. 5, lines 3-6 ) in order to produce a

predistorted signal; a mixer (converter 112) for converting the predistorted signal from a baseband frequency (col. 4, line 50) into an intermediate frequency (col. 5, line 16) in order to produce a converted signal (col. 5, lines 13-17); an amplifier (Power Amplifier 115) for amplifying the converted signal in order to produce an amplified signal (col. 5, lines 33-36); an antenna (antenna 117) for sending a first portion of the amplified signal (col. 5, lines 35-36); a mixer (combination of 123-124-125-229) for mixing a second portion of the amplified signal down from the intermediate frequency to the baseband frequency in order to produce a mixed-down signal (col. 8, lines 35-38); a measurement module (trainer 131) for comparing the mixed-down signal with the predistorted signal to determine the amplifier transfer property and for notifying the predistorter of the amplifier transfer property (col. 6, lines 5-21; col. 8, lines 43-50).

However, Cox et al. is silent on a signal generator for generating a test signal; and an input element for inputting at preset times the test signal into one of the modulated signal, the predistorted signal, and the converted signal, wherein the measurement module compares the test signal in the mixed-down signal with the test signal in the one of the modulated signal, the predistorted signal, and the converted signal to obtain the amplifier transfer property.

In disclosing an adaptive predistortion system (Fig. 1), however, Salinger teaches that the modulated symbol stream is first input to a predistorter with memory (col. 7, lines 10-11) before being amplified by a power amplifier (power amplifier 18) for transmission; then at preset times (from time to time; col. 7, line 19) a test signal (sequence of symbols; col. 7, line 20) is input into an amplifier (from the output of the predistorter with

memory, by means of switch 20; col.7, lines 19-22), and a modulated signal (the test sequence can either be sent as a continuous symbol stream that occasionally interrupts the data stream, or preferably as selected symbols that are part of the overhead bits that accompany each frame of data; col. 7, lines 25-28) by an input element [by implication]; wherein these test symbols are extracted from the power amplifier output and compared with the test signal in the modulated signal to obtain the amplifier transfer property (the measurements are used to readjust the symbol position mapping in the memory of the predistorter; col. 7, lines 32-34; the predistorter 14 functions to compensate for the nonlinear effects of the power amplifier 18; col. 7, lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Salinger into the method of Cox et al. because it would provide for a simple alternative to the adaptive predistorter in measuring the nonlinear distortions caused by the power amplifier.

As to signal generator, Dent et al. discloses (Fig. 1) a generator for generating test signals (test signal generator 21; col. 3, line 26) which in test mode is supplied to (by means of switch 31 [an input element]) an amplifier (amplifier 10 that amplifies the signal before transmission), wherein a portion of the amplified signal is fed back to a measurement unit (distortion analyzer 27; col. 5, line 18) that analyzes the distortion caused in the amplifier and provides a predistorter (predistortion circuit 28; col. 5, line 20) with the identified amplifier transfer function (col. 5, lines 16-24 and lines 37-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further incorporate the teachings of Dent et al. into the

method of Cox et al. and Salinger because it would provide for means for generating the test signals needed for measuring the distortion effect of the amplifier.

As to **Claim 14**, the recited features of the claimed transmitter are merely one instance of the same features of the subject matter mentioned in the rejection of Claim 13 above and are similarly analyzed.

A to **Claim 15**, Cox et al. also discloses a DSP based implementation, wherein the predistorter is loaded (stores) with a set of constant values (the predistortion values; col. 10, lines 46-54).

As to **Claim 19**, the claimed method for sending a signal over a wireless channel and all recited features of the claimed method correspond with subject matter mentioned in the rejection of Claim 13 above, similarly applicable hereto.

As to **Claim 20**, recited features of the claimed method are similarly analyzed as claims 13 and 14 above.

As to **Claim 21**, the recited features of the claimed method correspond with subject matter mentioned in the rejection of claims 13 and 14 and 15 above, similarly applicable hereto.

6. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cox et al. (US 5732333) in view of Salinger (US 6252912 B1) and Dent et al. (US 5262734) as applied to Claim 13 above, and further in view of Mojoli et al. (US 4615040).

AS to **Claim 16**, Cox et al., Salinger, and Dent et al. are all silent on the modulator performing a differential phase modulation. In disclosing high speed data communications system, however, Mojoli et al. teaches the predistortion (col. 7, lines 8-10) of the modulating signals for compensation adjustment for characteristics of amplifiers (col. 9, lines 36-42); and that the arrangement could be applied to modulating schemes such as differential phase shift keying (DSPK; col. 9, lines 50-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Mojoli et al. into the method of Cox et al. (in view of Salinger and Dent et al.) because it provides for high speed data communication system with a predistortion scheme for compensation of the distortion caused by the power amplifier in transmitter.

As to **Claim 17**, the recited feature of the claimed transmitter corresponds with subject matter mentioned in the rejection of Claim 16 above, similarly analyzed.

#### ***Allowable Subject Matter***

7. Claims 18, and 22-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Other prior art cited***

8. The prior art made of record and not relied upon is considered pertinent to



applicant's disclosure.

Shalom et al. (US 6166601) discloses a super-linear multi-carrier power amplifier that teaches the injection of a test signal in the predistorter.

Matero et al. (US 6125266) discloses dual band architectures for mobile stations having transmitter linearization feedback.

Oh (US 6265949 B1) discloses a phase compensation apparatus and method for a digital modulator.

Palandeeh et al. (US 5486789) discloses apparatus and method for providing a baseband digital error signal in an adaptive predistorter.

Carney et al. (US 5937011) discloses a multi-channel high power amplifier using digital predistortion.

Chiesa et al. (US 5524286) discloses a baseband predistortion system for the adaptive linearization of power amplifiers.

### ***Contact information***

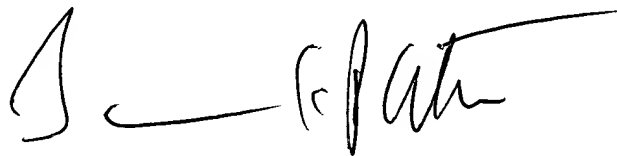
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jamshid Goshtasbi-G., whose telephone number is (571) 272-3012. The examiner can normally be reached on M-F 8:00/4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel, can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jamshid Goshtasbi-G.  
Examiner  
Art Unit 2637

A handwritten signature in black ink, appearing to read 'J. Patel', with a long horizontal stroke extending to the right.

JAYANTI PATEL  
SUPERVISORY PATENT EXAMINER